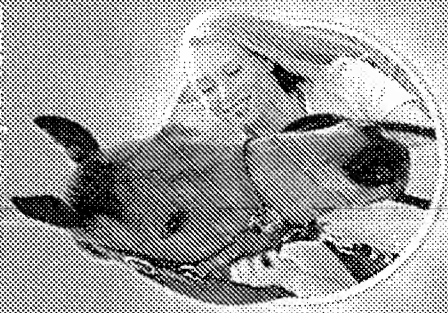


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West Nile Virus: Threat and Response

BY KAREN BRIGGS

For a definition of the value of vaccination, look no further than West Nile virus (WNV). When it coated onto the Eastern shore of the United States in 1999 (most likely thanks to a European or African bird), WNV struck fear into the hearts of horse owners when it quickly became clear that equines were more vulnerable to the virus than humans. Appearing more virulent than it had ever been on the other side of the Atlantic (where it had been recognized since the 1930s), WNV took full advantage of the naive immune systems of North American horses. One in three equines that contracted the disease died, and many survivors were left with lasting neurological problems.

Management beyond vaccination is important.

Editor's Note

This is the third in a 12-part series of articles on vaccinations for horses.

WACMAN

PART 3

The virus also showed an alarming ability to spread with its avian carriers—a wide variety of birds from blue jays to crows. Mosquitoes that feasted on infected avian blood, then punctured horses with their next bite, spread WNV from species to species. From 25 equine cases documented by APHIS (Animal and Plant Health Inspection Service of the United States Department of Agriculture) in 1999, all on the Eastern seaboard, the incidence of WNV in horses more than doubled to 60 (in New England, New York, and Pennsylvania) in 2000, then skyrocketed to 738 in 2001 as West Nile virus infiltrated the warm, humid, mosquito-friendly southern states of South Carolina, Georgia, and Florida.

From there it continued its rapid spread westward, reaching Montana and New Mexico in 2002 and devastating horse populations in the central states of Texas, Oklahoma, Nebraska, Iowa, Missouri, Illinois, and Minnesota, each of which reported in excess of 800 equine cases that year.

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May 2005: Mosquitoes
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(see maps on page 102). All told, there were more than 15,000 cases of WNV in horses in the United States in 2002, and the westward spread was nurtured in Canada as the virus hit Manitoba, a province that suddenly saw great irony in its claim that the mosquito is the "provincial bird." Of the 336 reported cases of equine WNV in Canada in 2002, 236 came from Manitoba, with the remainder in Ontario, Quebec, and Saskatchewan.

By 2004, WNV had been reported in every American state except Alaska, Hawaii, and Washington state, and it had progressed as far west as Alberta in Canada. But the overall number of cases had dropped significantly, especially in the east. In the continental United States, there were 3,181 reported cases of equine WNV in 2003, and the 2004 tally was just 1,341. Canada's numbers showed a similar trend—145 horses in 2003 and only 13 in 2004.

What caused the turnaround? Researchers speculate that climate conditions had a major impact; cooler, drier conditions in many parts of North America in the past two years just didn't favor a burgeoning mosquito population and could have affected bird migration patterns. Control measures—such as spraying and increased vigilance about cleaning up standing water where mosquitoes breed—helped too. But perhaps the most pivotal factor was the introduction of a vaccine protecting horses against WNV in August of 2001. First, tracked to the market on a conditional license, Fort Dodge Animal Health's West Nile Inavetax, a killed virus vaccine, was

instantly embraced by veterinarians and owners alike.

Protection from WNV

Fort Dodge's vaccine is, in fact, the first of its kind—a vaccine for horses that hit the commercial market before a comparable vaccine was available for humans. Ordinarily, it's the other way around, with developments in the veterinary pharmaceutical market lagging months or years behind treatments and preventions for people. Fort Dodge was able to launch its real-time response to the crisis through the use of a conditional license based on early challenge studies. By 2003, with millions of horses having received the vaccine and a strong record of safety and efficacy, it was granted full approval by the USDA.

W. David Wilson, BVMS, MS, professor of equine internal medicine and associate director of the large animal clinic in the Veterinary Medical Teaching Hospital at the University of California, Davis, explains, "In order to get a conditional license for a vaccine, you have to demonstrate (that the disease is) an imminent threat, and you have to demonstrate a reasonable expectation of efficacy and safety. Because West Nile virus is similar in many ways to the viruses for Eastern and Western equine encephalitis (EEE and WEE), formulating a vaccine for WNV wasn't much different than formulating those vaccines. Basically, they killed the (inactive) bug, added the adjuvant, and the vaccine was ready for testing, with expectations that it would perform similarly to those EEE and WEE



Even if vaccination has vastly reduced the incidence of WNV in horses, remember that the infection rate in mosquitoes is still high.

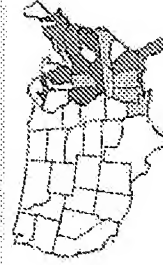
WEST NILE VIRUS' MARCH ACROSS THE UNITED STATES



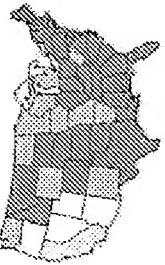
1999
Twenty-five equine cases of West Nile virus (WNV) were documented in 1999, all on the eastern seaboard.



2000
The incidence of WNV more than doubled to 60 equine cases in 2000 in New England, New York, and Pennsylvania.



2001
As WNV infiltrated the warm, humid, mosquito-friendly southern states of South Carolina, Georgia, and Florida, the number of equine cases skyrocketed to 738.



2002
As WNV continued its rapid spread westward, Montana, Washington state, Idaho, and New Mexico reported equine cases, and horse populations in the central states of Texas, Oklahoma, Nebraska, Iowa, Missouri, Illinois, and Minnesota each reported in excess of 800 cases. In total, there were more than 15,000 equine WNV cases in 2002.



2003
In the continental United States in 2003, there were 5,181 WNV equine cases reported.



2004
By 2004, WNV had been reported in every continental American state.

- Birds, mosquitoes, humans
- Horses, mosquitoes, humans
- Horses, mosquitoes
- Humans, horses
- Humans, mosquitoes

vaccines, which had already been proven very successful."

At the time researchers at Fort Dodge began their investigation into creating an equine West Nile vaccine, the disease had affected fewer than 100 horses in the United States. "You have to applaud them for taking the gamble," says Wilson. "When West Nile first showed up here, many predicted it was going to be no bigger than it generally is on the other side of the Atlantic. Few expected it would sweep across the continent the way it did or be so virulent. Fort Dodge thought otherwise, and their fast action certainly has paid off. I don't think there's anyone who's not grateful for the availability of that vaccine."

Kevin Handlin, DVM, MDA, assistant professor at Kansas State University and field veterinary consultant for Fort Dodge Animal Health, notes, "The demand (for West Nile Inavetax) was greater than we anticipated in 2001, but fortunately we were able to keep up. By 2002, it was in widespread use in the United States and had also been approved in Canada. By 2003, we saw cases of West Nile in horses drop dramati-

cally. That's pretty good evidence of efficacy, along with our challenge studies that demonstrated a 96% protection rate (against viremia), so it was relatively easy to get full approval for the vaccine in 2003."

There was, however, a blip on the radar that never had an impact on the USDA, but did temporarily make some horse owners hesitant to use the Fort Dodge vaccine. In 2003, a few individuals calling themselves the "Lost Foals Group" alleged that administering the West Nile virus vaccine to their broodmares had caused them to abort or have deformed foals. The accusation got some mainstream media attention in the Denver Post, and nervous horse owners started to question their veterinarians about the safety of the vaccine. Many reputable veterinarians spoke up in support of the safety and efficacy of Inavetax, while closer examination of the circumstances of the admittedly unlucky breeders of the Lost Foals Group revealed no substantiation for their claims.

"It was a lot of noise for a while there," says Handlin, "and it didn't really have an effect on sales because vets didn't buy into suggesting that there's no known risk in

it. But it did make the USDA and APHIS do something they normally don't do: They posted messages on their web sites supporting the use of Inavetax in horses and emphasizing the importance of vaccination against West Nile."

A recently completed retrospective study from Texas A&M University examining the vaccination history of 595 broodmares now confirms that there is no link between the Inavetax WNV vaccine and reproductive problems, although like many vaccines, West Nile Inavetax is not specifically labeled for use in pregnant mares.

"Use it at your veterinarian's discretion," says Handlin.

More discretion is needed regarding vaccination frequency. West Nile Inavetax is labeled for one-year duration of immunity to help prevent viremia, but many veterinarians recommend giving it more often where mosquitoes are active year-round.

"It's very important to communicate with your veterinarian to develop a protocol for your individual horses and your individual circumstances," Handlin emphasizes, while suggesting that there's no known risk in

